PCN	Numb	oer:	202	212	20000.2	P	CN Da	ate:	December 21, 2022		
Title	::	_			is an additional Fab s r select LBC8 devices	•	and n	ew As	ssembly & Test site		
Cus	tomer	Contact:		<u>PC</u>	<u>N Manager</u>	D	ept:		Quality Services		
Pro	posed	1 <sup>st</sup> Ship Date:					requ pted u		Jan 21, 2023*		
*Sa	Sample requests received after January 21, 2023 will not be supported.										
Cha	Change Type:										
$\boxtimes$	Assem	bly Site		$\boxtimes$	Assembly Process			Assembly Materials			
	Desigr	1			Electrical Specification			Mec	Mechanical Specification		
$\boxtimes$	Test S	ite			☐ Packing/Shipping/Labeling			Test Process			
	Wafer	Bump Site			Wafer Bump Mater	ial		Wafer Bump Process			
$\boxtimes$	Wafer	Fab Site			Wafer Fab Material	S		Waf	er Fab Process		
				☐ Part number change							
					PCN Detai	ls					

# **Description of Change:**

Texas Instruments is pleased to announce the qualification of its RFAB fabrication facility as an additional Wafer Fab option in addition to new AT (TIPI) & BOM options for the devices listed in the "Product Affected" section.

	Current Fa	b Site	New Fab Site			
Fab Site	Process	Wafer Diameter	Fab Site	Process	Wafer Diameter	
DP1DM5	LBC8	200 mm	RFAB	LBC8	300 mm	

Construction differences and AT site options are as follows:

	HANA	TIPI
Bond wire composition, diameter diameter(Cu)	Au, 0.96 mil	Cu, 0.96 mil
Mold Compound	SID#450207	4222198
Mount Compound	SID#6498861	4226215
MSL	LEVEL2-260C	LEVEL1-260C

Currently, there is no probe test step in the process for DP1DM5 die , but for the RFAB die, CD-PR will be activated as a probe site.

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ

### **Reason for Change:**

Supply continuity

# Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):

None

## **Impact on Environmental Ratings**

Checked boxes indicate the status of environmental ratings following implementation of this change. If below boxes are checked, there are no changes to the associated environmental ratings.

RoHS	REACH	Green Status	IEC 62474
⊠ No Change	⊠ No Change	No Change	☑ No Change

# Changes to product identification resulting from this PCN:

## **Fab Site Information:**

RFAB	RFB	USA	Richardson
DP1DM5	DM5	USA	Dallas
Chip Site	Chip Site Origin Code (20L)	Chip Site Country Code (21L)	Chip Site City

TIPI	PHI	PHL	Baguio City
HNA	HNT	THA	Ayutthaya
Assembly Site	Assembly Site Origin (22L)	Assembly Country Code (23L)	Assembly City

Sample product shipping label (not actual product label):



MADE IN: Malaysia 2DC: 2Q; MSL '2 /260C/1 YEAR SEAL DT MSL 1 /235C/UNLIM 03/29/04

OPT: ITEM:

(L)T0:1750 LBL: 5A



(1P) SN74LS07NSR

(a) 2000 (D) 0336 31T)LOT: 3959047MLA 4W) TKY(1T) 7523483812

(2P) REV: (V) 9099317 (20L) CSO: SHE (21L) CCO:USA (22L) ASO: MLA (23L) ACO: MYS

## **Product Affected:**

SN6505AQDBVRQ1	SN6505BQDBVRQ1	SN6505DQDBVRQ1	SN6505DQDBVTQ1
SN6505AQDBVTQ1	SN6505BQDBVTQ1		

Automotive New Product Qualification Summary (As per AEC-Q100 and JEDEC Guidelines)

SN6505Q DBV Redbull Approve Date 16-December-2022

#### Product Attributes

Attributes	Qual Device:	Qual Device:	Qual Device:	QBS Reference:	QBS Reference:	QBS Reference:
Attributes	SN6505AQDBVRQ1	SN6505DQDBVRQ1	SN6505BQDBVRQ1	TLV2401QDBVRQ1	LP87332ARHDRQ1	UCC27517AQDBVRQ1
Automotive Grade Level	Grade 1	Grade 1				
Operating Temp Range (C)	-40 to 125	-40 to 125				
Product Function	Interface	Interface	Interface	Signal Chain	Power Management	Power Management
Wafer Fab Supplier	RFAB	RFAB	RFAB	DL-LIN	RFAB	RFAB
Assembly Site	PHI	PHI	PHI	PHI	UTL1	PHI
Package Group	SOT	SOT	SOT	SOT	QFN	SOT
Package Designator	DBV	DBV	DBV	DBV	RHD	DBV
Pin Count	6	6	6	5	28	5

- QBS: Qual By Similarity
  Qual Device SN6505AQDBVRQ1 is qualified at MSL1 260C
  Qual Device SN6505DQDBVRQ1 is qualified at MSL1 260C
  Qual Device SN6505BQDBVRQ1 is qualified at MSL1 260C

#### **Qualification Results**

Data Displayed as: Number of lots / Total sample size / Total failed

Туре	#	Test Spec		SS / Lot	Test Name	Condition							QBS Reference: UCC27517AQDBVRQ1
Test Group	A - Acce	lerated Enviror	ment St	ress Tes	sts								
PC	A1	JEDEC J- STD-020 JESD22- A113	3	77	Preconditioning	MSL1 260C	1 Step	No Fails	-	-	No Fails	-	No Fails

HAST	A2	JEDEC JESD22- A110	3	77	Biased HAST	130C/85%RH	96 Hours	1/77/0	-	-	3/231/0	-	-
AC/UHAST	A3	JEDEC JESD22- A102/JEDEC JESD22- A118	3	77	Autoclave	121C/15psig	96 Hours	1/77/0	-	-	-	-	-
AC/UHAST	А3	JEDEC JESD22- A102/JEDEC JESD22- A118	3	77	Unbiased HAST	130C/85%RH	96 Hours	-	-	-	-	-	3/231/0
тс	A4	JEDEC JESD22- A104 and Appendix 3	3	77	Temperature Cycle	-65C/150C	500 Cycles	1/77/0	-	-	3/231/0	-	3/231/0
TC-BP	A4	MIL-STD883 Method 2011	1	5	Post Temp Cycle Bond Pull	-	-	1/5/0	-	-	-	-	3/15/0
HTSL	A6	JEDEC JESD22- A103	1	45	High Temperature Storage Life	150C	1000 Hours	1/45/0				-	3/135/0
HTSL	A6	JEDEC JESD22- A103	1	45	High Temperature Storage Life	175C	500 Hours	-	-		3/135/0	-	-
Test Group I	B - Acce	lerated Lifetime	e Simula	tion Tes	ts								
HTOL	B1	JEDEC JESD22- A108	1	77	Life Test	150C	408 Hours	-	-	-	3/231/0	-	
HTOL	B1	JEDEC JESD22- A108	1	77	Life Test	150C	500 Hours	-	-	-	-	3/231/0	-
ELFR	B2	AEC Q100- 008	1	77	Early Life Failure Rate	150C	24 Hours	-	-	-	-	3/2400/0	-
Test Group	C - Pack	age Assembly I	Integrity	Tests									
WBS	C1	AEC Q100- 001	1	30	Wire Bond Shear	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0	3/15/0	-	3/90/0
WBP	C2	MIL-STD883 Method 2011	1	30	Wire Bond Pull	Minimum of 5 devices, 30 wires Cpk>1.67	Wires	1/30/0	1/30/0	1/30/0	3/15/0	-	3/90/0
SD	C3	JEDEC J- STD-002	1	15	PB Solderability	>95% Lead Coverage	-	-	-	-	1/15/0	-	-
SD	СЗ	JEDEC J- STD-002	1	15	PB-Free Solderability	>95% Lead Coverage	-	-	-	-	1/15/0	-	1/15/0
PD	C4	JEDEC JESD22- B100 and B108	1	10	Physical Dimensions	Cpk>1.67	-	1/10/0	1/10/0	1/10/0	3/30/0	-	3/30/0
Test Group I	D - Die F	abrication Relia	bility Te	sts									
ЕМ	D1	JESD61		-	Electromigration		-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
TDDB	D2	JESD35			Time Dependent Dielectric Breakdown			Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
HCI	D3	JESD60 & 28			Hot Carrier Injection			Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
NBTI	D4	-	-	-	Negative Bias Temperature Instability		-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
SM	D5	-			Stress Migration		-	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements	Completed Per Process Technology Requirements
Test Group	E - Elect	rical Verification	n Tests										
ESD	E2	AEC Q100- 002	1	3	ESD HBM	-	2000 Volts	1/3/0	1/3/0	1/3/0	1/3/0	-	-
ESD	E3	AEC Q100- 011	1	3	ESD CDM	-	500 Volts	1/3/0	1/3/0	1/3/0	1/3/0	-	-
LU	E4	AEC Q100- 004	1	6	Latch-Up	Per AEC Q100-004	-	1/6/0	1/6/0	1/6/0	1/6/0	-	-
ED	E5	AEC Q100- 009	3	30	Electrical Distributions	Cpk>1.67 Room, hot, and cold	-	1/30/0	1/30/0	1/30/0	3/90/0	-	-
Additional T	ests												
Туре	#	Test Spec	Min Lot Qty	SS / Lot	Test Name	Condition	Duration	Qual Device	Qual Device	Qual Device	QBS Reference	QBS Reference	QBS Reference

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable
  The following are equivalent HTOL options based on an activation energy of 0.7eV: 125C/Ik Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours
  The following are equivalent HTSL options based on an activation energy of 0.7eV: 150C/Ik Hours, and 170C/420 Hours
  The following are equivalent Temp Cycle options per JESD47: -55C/I25C/700 Cycles and -65C/I50C/500 Cycles

#### Ambient Operating Temperature by Automotive Grade Level:

- Grade 0 (or E): -40C to +150C
   Grade 1 (or Q): -40C to +125C
   Grade 2 (or T): -40C to +105C
   Grade 3 (or I): -40C to +85C
- E1 (TEST): Electrical test temperatures of Qual samples (High temperature according to Grade level):
- Room/Hot/Cold : HTOL, ED
   Room/Hot : THB / HAST, TC / PTC, HTSL, ELFR, ESD & LU
   Room : AC/uHAST

Quality and Environmental data is available at TI's external Web site: http://www.ti.com/

TI Qualification ID: R-CHG-2203-051



### **Automotive Q006 Qualification Summary**

AEC-Q006 Table 3a: Integrated Circuit Qualification Test Requirements: Qualification Results

Qualification Device(s) BiCMOS analog

Technology attributes covered by this Q006 qualification

Silicon attributes: 300mm LBCx processes finished with BOAC in TI CLARK.

Bond pad metal technology: 'Copper top' Package family: SOT23 packages in TIPI

• Wire type: 1.3 Mil Copper wire / 0.96 Mil copper / 0.8 Mil copper wire.

Data Displayed as: Number of lots / Total sample size / Total failed

						Package	DBV (5 pin)	DBV (5 pin)	DDF (6 pin)
						Wire	1.3 mil Cu	0.96 mil Cu	0.8 Mil Cu
Туре	#	Test Spec	Min Lot Qty	SS/Lot	Test Name / Condition	Duration	Qual Device: TPS22810DBV	Qual Device: UCC2751xDBV	Qual Device: LM74700QDDFQ1
Test G	rou	A - Accelerated	Environment 9	Stress Te	st				
					SAM Analysis, Pre Stress	-	Passed	Passed	Passed

A - Accelerated  JESD22-113  JESD22-A101	- - 3 3	Stress Te	SAM Analysis, Pre Stress  Preconditioning  SAM Analysis, Post-Precon on 11 marked (or 22 random) units per lot before THB,	- Level 3-260C	Passed Passed	Passed Passed	Passed Passed
	3 3	-	Preconditioning  SAM Analysis, Post-Precon on 11 marked (or 22 random) units per lot before THB,	- Level 3-260C	Passed	Passed	Passed
	3 3	-	SAM Analysis, Post-Precon on 11 marked (or 22 random) units per lot before THB,	Level 3-260C			
JESD22-A101	3	- 77	(or 22 random) units per lot before THB,		Decend M-		
JESD22-A101	3	77	TC, PTC and HTSL		Passed : No delamination	Passed : No delamination	Passed : No delamination
			BHAST, Vmax/130C/85% RH	96 Hours	3/231/0		3/231/0
		1	Cross Section, Post bHAST 96 Hours	-	3/3/0		3/3/0
	3	11 / 22	SAM Analysis, Post bHAST, 96 Hours	-	3/33/0		Skipped to 2x
	3	3	Wire Bond Shear, Post bHAST, 96 Hours	units	3/9/0		3/9/0
	3	3	Bond Pull over Stitch, post bHAST, 96 Hours	units	3/9/0		3/9/0
	3	3	Bond Pull over Ball, Post bHAST, 96 Hours	units	3/90/0		3/90/0
JESD22-A101	3	70	BHAST, Vmax/130C/85% RH	192 Hours	3/210/0		3/210/0
	3	1	Cross Section, Post bHAST 192 Hours	-	3/3/0		3/3/0
	3	11 / 22	SAM Analysis, Post bHAST, 192 Hours	-	3/33/0		3/66/0
	3	2	Wire Bond Shear, Post bHAST, 192 Hours	units	3/9/0		3/9/0
	3	2	Bond Pull over Stitch, post bHAST, 192 Hours	units	3/9/0		3/9/0
	3	2	Bond Pull over Ball, Post bHAST, 192 Hours	units	3/9/0		3/9/0
JESD22-A104		77	Temperature Cycle, -65/150C	500 Cycles	3/231/0	1/77/0	3/231/0
		1	Cross Section, Post T/C 500 Cycles	-	3/3/0	1/1/0	3/3/0
	3	11 / 22	SAM Analysis, Post T/C, 500 Cycles	-	3/33/0	1/11/0	3/66/0
	3	3	Wire Bond Shear, Post T/C 500 Cycles	units	3/9/0	1/3/0	3/9/0
	3	3	Bond Pull over Stitch Post T/C 500 Cycles	units			3/9/0
	3	3	Bond Pull over Ball Post T/C 500 Cycles	units	3/9/0	1/3/0	3/9/0
JESD22-A104	3	70	Temperature Cycle, -65/150C	1000 Cycles	3/210/0	1/70/0	3/210/0
	3	1	Cross Section, Post T/C 1000 Cycles	-	3/3/0	1/1/0	3/3/0
		11 / 22	SAM Analysis, Post T/C, 1000 Cycles	-	3/33/0	1/11/0	3/66/0
	3	2	Wire Bond Shear, Post T/C 1000 Cycles	units	3/6/0	1/2/0	3/6/0
	3	2	Bond Pull over Stitch, Post T/C, 1000 Cycles	units	3/6/0	1/2/0	3/6/0
	3	2	Bond Pull over Ball, Post T/C, 1000 Cycles	units	3/6/0	1/2/0	3/6/0
JESD22-A105	1		Power Temperature Cycle	1000 Cycles	NA	NA	NA
JESD22-A105		45	Power Temperature Cycle	2000 Cycles	NA	NA	NA
JESD22-A103		45	High Temp Storage Bake 150C*	1000 Hours	3/135/0		3/135/0
	3	1	Cross Section, Post HTSL 1000 Hours	-	3/3/0		3/3/0
	3	44	High Temp Storage Bake 150C	2000 Hours	-		3/132/0
	3	1	Cross Section, Post HTSL 2000 Hours	-	-		3/3/0
	3	45	High Temp Storage Bake 175C	500 hours		1/45/0	
	3	1	Cross Section, Post HTSL 500 Hours			1/1/0	
	3	44	High Temp Storage Bake 175C	1000 hours		1/44/0	
	3	1	Cross Section, Post HTSL 1000 Hours			1/1/0	
J	ESD22-A104  ESD22-A105 ESD22-A105	3 3 3 ESD22-A104 3 3 3 3 3 3 3 ESD22-A104 3 3 3 ESD22-A105 1 ESD22-A105 1 ESD22-A105 1 ESD22-A105 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	3 2  SESD22-A104 3 77  3 1  3 11/22  3 3 3  SESD22-A104 3 70  3 1  3 11/22  3 3 2  SESD22-A104 3 70  3 1  4 5  SESD22-A105 1 45  SESD23-A105 1 45  SESD24-A103 3 45  3 1  3 44  3 1  3 44  3 1  3 44	3 2 Wire Bond Shear, Post bHAST, 192 Hours 3 2 Bond Pull over Stitch, post bHAST, 192 Hours 3 2 Bond Pull over Ball, Post bHAST, 192 Hours 3 2 Bond Pull over Ball, Post bHAST, 192 Hours 4 Temperature Cycle, -65/150C 5 Temperature Cycle, -65/150C 6 Temperature Cycle, -65/150C 7 Temperature Cycle, -65/150C 7 SAM Analysis, Post T/C, 500 Cycles 7 SAM Analysis, Post T/C, 500 Cycles 8 Bond Pull over Stitch Post T/C 500 Cycles 9 Samperature Cycle, -65/150C 9 Temperature Cycle, -65/150C 9 Temperature Cycle, -65/150C 9 Temperature Cycle, -65/150C 9 Temperature Cycle, -65/150C 9 SAM Analysis, Post T/C, 1000 Cycles 9 SAM Analysis, Post T/C, 1000 Cycles 9 Samperature Cycle, -65/150C 9 Samperature Cycle 9 Samp	3   2   Wire Bond Shear, Post bHAST, 192 Hours   units	3 2 Wire Bond Shear, Post bHAST, 192 Hours units 3/9/0  3 2 Bond Pull over Stitch, post bHAST, 192 units 3/9/0  3 2 Bond Pull over Ball, Post bHAST, 192 units 3/9/0  3 2 Bond Pull over Ball, Post bHAST, 192 units 3/9/0  ESD22-A104 3 77 Temperature Cycle, -65/150C 500 Cycles 3/231/0  3 1 Cross Section, Post T/C 500 Cycles - 3/3/0  3 11/22 SAM Analysis, Post T/C, 500 Cycles units 3/9/0  3 3 Wire Bond Shear, Post T/C 500 Cycles units 3/9/0  3 3 Bond Pull over Stitch Post T/C 500 Cycles units 3/9/0  3 3 Bond Pull over Ball Post T/C 500 Cycles units 3/9/0  3 1 Cross Section, Post T/C 500 Cycles units 3/9/0  3 1 Cross Section, Post T/C 1000 Cycles - 3/33/0  3 11/22 SAM Analysis, Post T/C, 1000 Cycles - 3/33/0  3 11/22 SAM Analysis, Post T/C, 1000 Cycles - 3/33/0  3 2 Wire Bond Shear, Post T/C 1000 Cycles units 3/6/0  3 2 Bond Pull over Stitch, Post T/C, 1000 Cycles units 3/6/0  3 2 Bond Pull over Stitch, Post T/C, 1000 Cycles units 3/6/0  3 2 Bond Pull over Stitch, Post T/C, 1000 Cycles units 3/6/0  3 2 Bond Pull over Ball, Post T/C, 1000 Cycles units 3/6/0  3 2 Bond Pull over Ball, Post T/C, 1000 Cycles units 3/6/0  3 2 Bond Pull over Ball, Post T/C, 1000 Cycles units 3/6/0  3 1 Cross Section, Post HTSL 1000 Hours - 3/3/0  3 1 Cross Section, Post HTSL 1000 Hours	3

3. Bond pulls, shears and stitch pulls show no degradation – distribution showing similar performance to unaged devices

TI Qualification ID: 20170418-121595 , 20191011-131872 and 20200416-133706

For alternate parts with similar or improved performance, please visit the product page on TI.com

For questions regarding this notice, e-mails can be sent to the contact shown below or your local Field Sales Representative.

Location	E-Mail
WW Change Management Team	PCN www admin team@list.ti.com

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